

CLAIMS:

1. Non-fragmenting, forward-acting pressure relief apparatus comprising:
a rupture disc having a central section and a peripheral flange section;
said central section of the disc having a line of weakness extending around a part of
5 the central section, said line of weakness having opposed end regions in
spaced relationship that define a unitary hinge portion therebetween, each of
said end regions having an outermost end,
said line of weakness defining a part of the central section of the disc that ruptures
and opens upon application of a force of at least predetermined magnitude to
10 said central section,
a hold-down member for the rupture disc and having an inner opening in generally
circumscribing relationship to the central section of the disc,
said hold-down member being provided with a unitary segment that extends into the
inner opening of the hold-down member thereof,
15 said segment of the hold-down member engaging the hinge portion of the disc in
disposition overlying said end regions of the line of weakness,
said segment having an innermost margin extending between opposed end regions
of the line of weakness in inwardly spaced relationship from respective
outermost ends of the line of weakness.
20 2. Apparatus as set forth in claim 1, wherein said segment of the hold-
down member has a generally rectilinear outer margin.
3. Apparatus as set forth in claim 2, wherein said segment of the hold-
down member is of generally planar configuration.

4. Apparatus as set forth in claim 1, wherein said central section of the rupture disc is of generally planar configuration.

5. Apparatus as set forth in claim 2, wherein said central section of the rupture disc has a bulged portion.

5 6. Apparatus as set forth in claim 5, wherein said bulged portion of the central section of the disc is of generally asymmetric shape.

7. Apparatus as set forth in claim 6, wherein the portion of the central section of the rupture disc between engaged by said segment of the hold-down member is of generally flat configuration.

10 8. Apparatus as set forth in claim 1, wherein said margin of the hold-down member segment is generally rectilinear and has opposed extremities that overly and extend beyond opposite respective portions of the line of weakness.

9. Apparatus as set forth in claim 1, wherein a transverse portion of the segment of the hold-down member extending inwardly in a direction away from said margin
15 of the segment is deflected by the hinge portion of the central section of the disc during rupture of the central section of the disc along substantially the full length of the line of weakness, said deflected transverse portion of the segment of the hold-down member absorbing a part of said rupture force applied to the central section of the disc to divert said part of the force away from the part of said hinge portion extending between respective
20 outermost ends of the line of weakness.

10. Apparatus as set forth in claim 9, wherein said deflected transverse portion of the segment of the hold-down member presents a generally inclined outwardly facing surface engaged by the hinge portion of the disc, which in conjunction with the force absorbed by the deflected transverse portion of the hold-down member segment contributed

to prevention of separation of the central section of the disc from the peripheral flange section thereof at the hinge portion of the disc.

11. Apparatus as set forth in claim 1, said opposed end regions of the line of weakness converging toward one another and located beneath the hold-down member
5 segment.

12. Apparatus as set forth in claim 1, wherein said line of weakness is defined by a series of elongated, end-to-end, spaced slits extending through the central section of the rupture disc, said slits being separated from one another by individual webs that are unitary with the remainder of the central section of the disc.

10 13. Apparatus as set forth in claim 12, wherein each of said slits is of substantially greater length than the width of each web between respective ends of adjacent slits.

14. Apparatus as set forth in claim 1, wherein the central section of said rupture disc has an outer edge portion that is generally circular, said hold-down member
15 being of generally annular configuration with the inner opening thereof surrounding the circular edge portion of the central section of the disc.

15. Apparatus as set forth in claim 14, wherein the central section of the disc has a major bulged portion and a unitary minor relatively flat portion, said flat portion of the disc being in engagement with said segment of the hold-down member.

20 16. Apparatus as set forth in claim 15, wherein the bulged portion of said central section of the rupture disc is of asymmetric shape.

17. Apparatus as set forth in claim 16, wherein the part of the bulged portion of the central section of the rupture disc remote from the hinge portion of the disc is of greater three dimensional curvature than the three dimensional curvature of the bulged

portion of the central section of the rupture disc that approaches and merges into the flat portion of the central section of the rupture disc.

18. Apparatus as set forth in claim 1, wherein the line of weakness in the central section of the disc is configured and sized and the segment of the hold-down member engaging the central section of the disc is oriented with respect to the end regions of the line of weakness such that upon rupture of the central section of the disc along the line of weakness, the hinge portion of the central section of the disc defined by the end regions of the line of weakness bends around the outer margin of the segment of the hold-down member thus precluding separation of said hinge portion and thereby the central section of the disc from the peripheral flange section thereof along an imaginary line between said outermost ends of the end regions of the line of weakness

19. Apparatus as set forth in claim 12, wherein is provided a pair of said discs, said discs being positioned with one disc overlying the other disc, there being a layer of material therebetween precluding passage of fluid through the slits until rupture of the webs between the slits of each line weakness of respective discs resulting in rupture of the central section of both of the discs.

20. Apparatus as set forth in claim 19, wherein each of the discs is of sheet material, the thickness of the sheet material of one of the discs being greater than the thickness of the material of the other disc.

21. Apparatus as set forth in claim 1, wherein is provided a pair of said discs with one disc overlying the other disc, said hold-down member being located between the pair of discs.

22. Apparatus as set forth in claim 21, wherein the central section of each disc has a major bulged portion and a minor flat portion, the minor flat portion of one disc engaging the segment of the hold-down member.